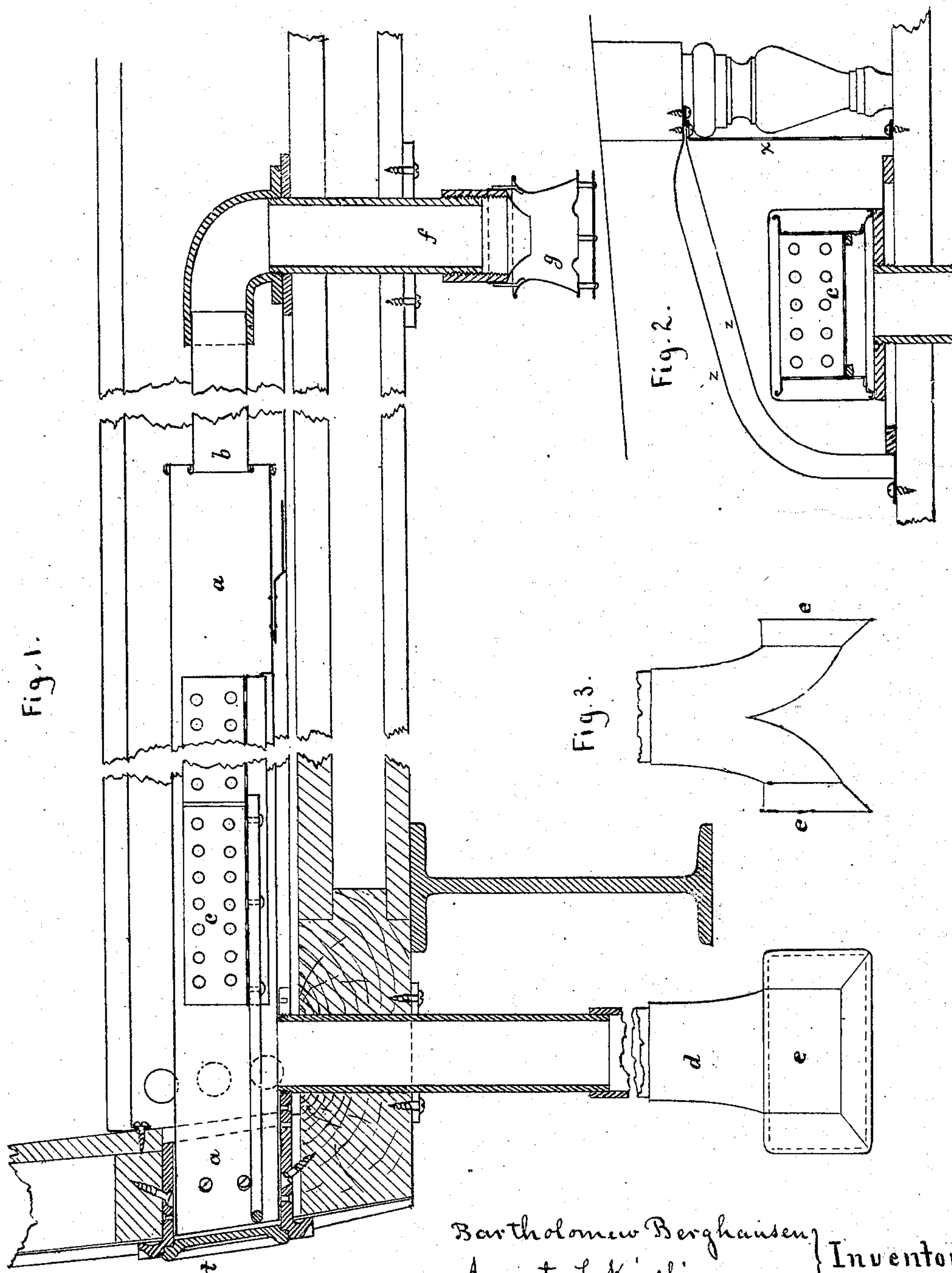


B. BERGHAUSEN & A. L. KIESLING.

Railroad Car-Heaters.

No. 144,183.

Patented Nov. 4, 1873.



Witnesses:

C. H. Isham

H. A. Daniels

Bartholomew Berghausen } Inventors  
August L. Kiesling }  
Charles J. Whitman } Attorney



# UNITED STATES PATENT OFFICE.

BARTHOLOMEW BERGHAUSEN AND AUGUST LOUIS KIESLING, OF  
COLOGNE, GERMANY.

## IMPROVEMENT IN RAILROAD-CAR HEATERS.

Specification forming part of Letters Patent No. 144,183, dated November 4, 1873; application filed  
January 11, 1873.

*To all whom it may concern:*

Be it known that we, BARTHOLOMEW BERGHAUSEN and AUGUST LOUIS KIESLING, both of Cologne, in the Empire of Germany, have invented an Apparatus for Heating or Warming of Rooms, Railway, and other Carriages; and the following description, taken in connection with the accompanying plate of drawings hereinafter referred to, forms a full and exact specification, wherein are set forth the nature and principles of the invention, by which the same may be distinguished from others of a similar class, together with such parts thereof as are claimed as new and are desired to be secured by Letters Patent of the United States.

Our invention relates to that class of devices which are made use of for heating railway and other carriages; and the nature thereof consists in certain improvements in the construction of the same, hereinafter shown and described.

In the accompanying plate of drawings, in which corresponding parts are illustrated by similar letters, Figure 1 is a longitudinal vertical section of the seat of a railway-carriage with my invention applied thereto. Fig. 2 is an end view thereof. Fig. 3 illustrates the adjustable mouth through which the air enters.

The difficulties of solving the problem of warming railway and other carriages are, the impossibility of employing ordinary fuel, and ordinary heating apparatus, on account of the rapid draft which they both require; the necessity of a chimney for that purpose; further, the frequent alterations, or the large consumption of fuel and the consequent labor upon it, and the impossibility of placing such stove, containing a bright and hot fire, in the carriage without being a source of danger to the train, and disagreeably hot to some of the passengers.

By the employment of our apparatus, together with the fuel which we especially prepare for use in the same, we are enabled to charge, for once and all, in twelve, twenty-four, or thirty-six hours, the apparatus in such a manner that a uniform heat will be given out during every part of that time, and be equally distributed from under the seat and

close to the feet of the passengers with a most trifling consumption of fuel. About two pounds of the fuel used for an ordinary compartment will raise the temperature from zero to 24° Reaumur and maintain it at that from ten to twelve hours. The construction of our warming apparatus is such as to cause the combustion of the fuel to be of a slow smoldering and glowing kind, and to require only a small quantity of air to pass in, through, and out of the same; but at the same time the construction of the apparatus makes it necessary, for the good working thereof, to have a fuel especially adapted for the purpose, as that described below. In this fuel, which burns without either smoke or flame, the oxygen-bearing ingredients convey, communicate, and partly maintain combustion independent of any great rush of atmospheric air through the same. By these means the whole, or nearly the whole, of the heat generated is given out inside the carriage, and hence the small consumption of fuel for the effect produced.

*a* is a thin copper or metal tube on one side of the carriage. It penetrates through the paneling of the carriage, and is here closed by the small metal door *t*. If two apparatus are placed, then there will be a small metal door on each side of the carriage. Through this door *t* the fuel is introduced into *a*. On the opposite end of tube *a* the small tube *b* joins and enters *a* to receive the fumes or gases generated during combustion in *a*, and to carry and expel them underneath the carriage bottom into the outer atmospheric air. Tube *b*—the longer the better—is placed, according to the build of the carriage, in such a manner as best to utilize the heat it has received from the passage of the hot gases toward the warming of the carriage. The grate or fuel tray *c* has its place in *a*, and is the only movable part of the apparatus. It is the receptacle of the fuel, and is in shape an open box, perforated on all sides, having a false bottom, corrugated and made uneven, so that the heat will travel without hindrance all round the fuel. Underneath is the actual bottom to receive the ashes. When the grate *c* or fuel-tray is to be charged with fuel, it is drawn toward the door and then pushed back into its proper place—in



which it is kept by means of iron slips and stops placed in *c*—to prevent the pieces of fuel being shaken out of their place small iron slips are fastened at intervals in the sides of the grate *c*. The necessary air to keep the fuel alight or burning is brought into *a* by a second small tube, *d*, which has its position in front of the longitudinal beam of the carriage-frame. Tube *d* enters close to the small metal door *t*, and has at its end two adjustable mouths, *e e*, one in each direction of the train, so, no matter in what direction the train is traveling, one of these mouths *e* will be active to catch the draft of the moving train on the carriage and carry it into and so past the metal door. The cold stream of air constantly traveling here will prevent the metal door *t* from becoming warm. The other small tube, *f*, has at its end, close underneath the carriage flooring, the suction apparatus *g*, so constructed as to suck or draw out of the tube *f*, with the help of the air-current, the products of the combustion going on in *a*, and to expel them into the outer air. Care has been taken, in laying down the apparatus, against the nuisance of the heat escaping into the cushions. A thin double iron plate, *z z*, with a small air-chamber between, will guard against this. The wire-netting screen or perforated thin iron plate *x* is placed in front of the apparatus to guard against the legs or clothes of the passengers from touching any of the warm parts of the apparatus.

The salient points of construction of the apparatus are, first, the horizontally-placed box or tube of thin sheet metal, inserted through the flooring or paneling of the carriage; second, the direction downward of the exit-pipe, the injector or steam-blast-like action of the same, by which action the gases are sucked or

drawn out of the apparatus with the help of the air-current caused by the motion of the train; third, the adjustable bell-mouthed inlet-pipe, taking its air from below; fourth, the movable perforated fuel tray or box, with its divisions for the individual cakes of fuel.

The working of our heating apparatus, together with the fuel described, takes place as follows: The movable fuel-tray *c* is drawn out of the heating apparatus, and into the same are placed a number of bricks of artificial fuel, and these are fixed in their position by slips of sheet-iron, in the manner described above, the number and size varying according to the length of the journey to be performed and the temperature required. One of the pieces of fuel is then well ignited and placed in the grate or fuel-tray, which is then pushed back into its proper place, but so as not to close the aperture for the exit of the hot gases. The iron door of the apparatus is then closed, and the latter will then fulfil its functions of warming the carriage to the end of the journey.

Having now described the nature of our invention, and the mode in which it is to be carried out, what we claim is—

The tubes *a* and *b*, fuel-tray *c*, tube *d* provided with adjustable mouths *e*, and tube *f* provided with a suction apparatus, *g*, all combined and operating together, as described.

In testimony that we claim the foregoing we have hereunto set our hands and seals this 15th day of July, 1872.

B. BERGHAUSEN, *Engineer*. [L. S.]  
AUGUST LOUIS KIESLING. [L. S.]

Witnesses:

C. S. WHITMAN,  
HENRY HOLSCHER.